AMENDMENTS TO THE DRAWINGS

The attached two sheets of drawings include replacement drawing figures 1 and 2. These two replacement sheets replace the original first and second sheets of drawings including figures 1 and 2. A legend "(Prior Art)" has been added to each of the figures.

REMARKS

Claims 1, 3-10, 12 and 13 are presented for reconsideration and further examination in view of the following remarks.

In the outstanding Office Action, the Examiner rejected claims 1 and 3-12 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,687,752 to Falco et al. (hereinafter referred to as "Falco et al.") and rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Falco et al. in view of U.S. Patent Application Publication No. 2004/0090994 to Lockridge et al. (hereinafter referred to as "Lockridge et al."). The Examiner objected to the drawings and to the specification.

Claims 1, 3-10, 12 and 13 are pending in this application. Claims 1 and 3-13 have been rejected. Claims 1 and 3-13 and portions of the specification and drawings have been amended, for the sole reason of advancing prosecution. Claim 2 was previously canceled without prejudice or disclaimer to the subject matter therein; by this Response and Amendment, the subject matter of claim 11 has been incorporated into the independent claims and claim 11 canceled without prejudice or disclaimer to the subject matter therein. Claims 1, 12 and 13 have been amended to further clarify the subject matter claimed therein and to more positively recite the claim features in accordance with the discussions in the Interview(s) conducted August 10 and 11, 2009. The dependent claims have been amended to further conform to U.S. patent practice; for example these claims now recite "*The* method..." instead of "*A* method..." (emphases added). Applicants, by amending or canceling any claims herein, make no admission as to the validity of any rejection made by the Examiner against any of these claims. Applicants reserve the right to reassert the original claim scope of any claim amended or canceled, in a continuing application.

Support for the claims as amended, appears throughout the specification and claims as originally filed. It is respectfully submitted that the amendments do not introduce any new matter within the meaning of 35 U.S.C. §132.

Applicants hereby fully reference and incorporate the remarks and arguments made in the Reply and Amendment under 37 C.F.R. §1.116, filed December 29, 2008, in response to the Office Action mailed October 28, 2008, and the remarks and arguments made in the Amendment under 37 C.F.R. 1.111, filed July 8, 2008, in response to the Office Action mailed April 8, 2008, in their entirety, where appropriate.

Interview Summary

Applicants thank the Examiner for the courtesies extended to Applicants' Representative during the telephone discussions/Interview with the Examiner on August 10 and 11, 2009. Discussion focused on the best mode of addressing the formality objections and on the claims; Applicants thank the Examiner for the opportunity to work together toward alternative claim language to further clarify and define the claimed subject matter. Applicants' Representative presented to the Examiner proposed amendments to the independent claims that clarified the recitation of "each control packet including a remote real time-stamp comprising a system clock time... and a separate remote media card clock time-stamp..." within the claims. The Examiner favorably regarded the proposed claim amendments and made further suggestions to refine the claim language. Applicants thank the Examiner for providing a verbal indication that the claimed subject matter, as amended, overcame the cited art references of record. Accordingly, and in view of the Interview and the Examiner's helpful suggestions, Applicants submit revised claims herewith.

Objection(s) to the Drawings

The Examiner objected to the drawings, asserting on page 2 of the Office Action that "Figures 1 and 2 should be designated by a legend such as --Prior Art--."

Response

By this Response and Amendment, Applicants submit two sheets of replacement drawings, amending Figure 1 and Figure 2, to incorporate a "(Prior Art)" legend as suggested by the Examiner. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections thereto.

Objection(s) to the Specification

The Examiner objected to the specification, and provided a guideline on pages 2-3 of the Office Action "illustrat[ing] the preferred layout for the specification of a utility application."

Response

By this Response and Amendment, Applicants have amended the specification to incorporate section headings, as suggested by the Examiner. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections thereto.

Claim Rejections under 35 U.S.C. § 103(a)

The Examiner rejected claims 1 and 3-12 under 35 U.S.C. § 103(a) as being unpatentable over Falco et al. and rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Falco et al. in view of Lockridge et al.

Response

As discussed above, claim 11 has been canceled without prejudice or disclaimer to the contents therein; accordingly the rejection thereto is moot. Claims 1, 3-10, 12 and 13 have been amended or depend upon amended claims and, as amended, the rejections thereto are respectfully traversed. Applicants respectfully traverse the rejections since all of the features of the presently claimed subject matter are not disclosed by the cited references.

To establish a *prima facie* case of obviousness, the PTO must satisfy three requirements. First, as the U.S. Supreme Court held in *KSR International Co. v. Teleflex Inc. et al.*, 550 U. S. 398 (2007), "a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions. ...it [may] be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. ...it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." (*KSR*, 550 U.S. at 417). A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. *See Dystar Textilfarben GMBH v, C. H. Patrick*, 464 F.3d 1356 (Fed. Cir. 2006). The Examiner bears the

initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. *Id.* at 1366.

Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *Amgen Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991). Lastly, the prior art references must teach or suggest all the limitations of the claims. *In re Wilson*, 165 USPQ 494, 496 (C.C.P.A. 1970).

Applicants submit that a proper case of *prima facie* obviousness has not been established because, whether taken alone or together, none of the cited references teach or suggest all the limitations of the claims as required by *In re Wilson.*

Overview

Independent claim 1 recites [[a]] *method operable in a local device for determining clock skew in a packet-based session between said local device and a remote device with a non-deterministic packet delay*, said method *comprising* the steps of:

> r*eceiving a sequence of control packets from the remote device* transmitting media packets in a session, *each control packet including a remote real time-stamp comprising a system clock time of the remote device and a separate remote media card clock time-stamp comprising a media card clock time of the remote device corresponding to the remote real time-stamp;*
>
> *comparing a first real-time stamp and a first remote media card clock time-stamp from a first received control packet with a second real-time stamp and a second remote media card clock time-stamp from a second received control packet, respectively, to determine* from said two received control packets, a *first relative rate of a remote media card clock to the remote real time system clock;*
>
> *transmitting a sequence of control packets* from said local device transmitting media packets in said session, *each control packet including a local real time-stamp comprising a system clock time of the local device and a separate local media card clock time-stamp comprising a media card clock time of the local device corresponding to the local real time-stamp; and*

comparing a third real-time stamp and a first local media card clock time-stamp from a first transmitted control packet with a fourth real-time stamp and a second local media card clock time-stamp from a second transmitted control packet, respectively, to determine from said two transmitted control packets, *a second relative rate of a local media card clock to the local real-time system clock*

(emphases added).

Independent claim 12 recites [a] device arranged to determine clock skew in a packet-based session with a non-deterministic packet delay between said device and a remote device, said device being arranged to:

> receive a sequence of control packets from the remote device transmitting media packets in a session, each control packet including a remote real time-stamp comprising a system clock time of the remote device and a separate remote media card clock time-stamp comprising a media card clock time of the remote device corresponding to the remote real time-stamp;
>
> compare a first real-time stamp and a first remote media card clock time-stamp from a first received control packet with a second real-time stamp and a second remote media card clock time-stamp from a second received control packet, respectively, to determine from said two received control packets, a first relative rate of a remote media card clock to the remote real time system clock;
>
> transmit a sequence of control packets from said local device transmitting media packets in said session, each control packet including a local real time-stamp comprising a system clock time of the local device and a separate local media card clock time-stamp comprising a media card clock time of the local device corresponding to the local real time-stamp; and
>
> compare a third real-time stamp and a first local media card clock time-stamp from a first transmitted control packet with a fourth real-time stamp and a second local media card clock time-stamp from a second transmitted control packet, respectively, to determine from said two transmitted control packets, a second relative rate of a local media card clock to the local real-time system clock.

Independent claim 13 recites [a] computer program product comprising computer program code stored on a storage medium which when executed in a local device is arranged to determine clock skew in a packet-based session with a non-deterministic packet delay between said local device and a remote device, said method comprising the steps of:

receiving a sequence of control packets from the remote device transmitting media packets in a session, each control packet including a remote real time-stamp comprising a system clock time of the remote device and a separate remote media card clock time-stamp comprising a media card clock time of the remote device corresponding to the remote real time-stamp;

comparing a first real-time stamp and a first remote media card clock time-stamp from a first received control packet with a second real-time stamp and a second remote media card clock time-stamp from a second received control packet, respectively, to determine from said two received control packets, a first relative rate of a remote media card clock to the remote real time system clock;

transmitting a sequence of control packets from said local device transmitting media packets in said session, each control packet including a local real time-stamp comprising a system clock time of the local device and a separate local media card clock time-stamp comprising a media card clock time of the remote device corresponding to the local real time-stamp; and

comparing a third real-time stamp and a first local media card clock time-stamp from a first transmitted control packet with a fourth real-time stamp and a second local media card clock time-stamp from a second transmitted control packet, respectively, to determine from said two transmitted control packets, a second relative rate of a local media card clock to the local real-time system clock.

As previously discussed, Falco et al. is directed to the improvement of the quality with which multimedia data is transmitted across a network in the face of poorly implemented timestamping within Internet protocols. *See* Falco et al. col. 3, lines 1-10.

Lockridge et al. describes "[a] method and an apparatus using a system level clocking scheme to remove jitter from multi-media packets distributed over an asynchronous network." *See* Lockridge et al. Abstract.

Rejection of claims 1 and 3-12

As discussed above, claim 11 has been canceled without prejudice or disclaimer to the contents therein; accordingly the specific rejection thereto is moot. The subject matter of this claim has been incorporated into the independent claims.

The Examiner has admitted on pages 5-6 of the Office Action that Falco et al. does not disclose "comparing a third real-time stamp and a first local comparing a third real-time stamp and a first local media card clock time-stamp from a first transmitted control packet with fourth real-time stamp and a second local media card clock time-stamp from a second transmitted control packet to determine from said two transmitted control packets, a second relative rate of a local media card clock to the local real-time rate," as previously recited in the claims.

Applicants respectfully submit that in contrast to independent claims 1 and 12, Falco et al. is not concerned with, nor discloses, any "clock skew" whatsoever. Falco et al. is primarily concerned with whether or not Internet RTP timestamps are implemented 'incorrectly' and/or are 'unreliable', 'adverse' or 'improper.' *See* Falco et al. col. 3,.lines 1-10, 20-25, and 40-43; col. 7, lines 7-10 and 65-66; and col. 8, lines 43-45. Falco et al. states that "[p]roper use of properly timestamped inputs lends itself to high-quality rendition...." *See* Falco et al. col. 8 lines 40-42. Applicants note that this can only be so in absence of skew, but Falco et al. simply does not consider skew. So, if timestamping is implemented correctly, Falco et al. switches to TS mode and never leaves it. Buffers may well be overflowing at receiver nodes due to skew, but the mechanism of Falco et al. is not designed in any way to tackle skew, which is notably the subject of the present application.

Instead, starting in TOA mode, Falco et al. uses 3 different tests to determine if timestamps are okay or not:

1. Referring to Figure 5 and its corresponding description, using consecutive RTCP SR packets, Falco et al. looks at deltaRTP and deltaNTP and if difference exceeds a threshold, Falco et al. assumes a problem with timestamps. Falco et al. never suggests looking at relative rates of RTP Timestamps to NTP timestamps which is not surprising as Falco et al. outlines earlier that they come from same source i.e. wall clock time.

2. Referring to Figure 6 and its corresponding description, using localized timestamps to estimate one way delay, Falco et al. looks for big changes and if present, assumes a timestamp problem
3. Again, referring to Figure 6 and its corresponding description, Falco et al. compares RTCP SR RTP timestamps and compares this with 5 previously received RTP packet timestamps and if 5 RTP timestamps are 'later', Falco et al. correctly concludes there is a serious problem.

Using these checks, Falco et al. decides to either stay in TOA mode or switch to TS mode or indeed switch back from TS to TOA. As such, Falco et al. is simply looking for problems with timestamping. Falco et al. states that using the above tests, "a receiver node can benefit from RTP timestamps, but avoid much of the adverse performance impact in which improper timestamp application can result." *See* Falco et al. col. 3 lines 40-43. Thus, it should be clear that Falco et al. uses timestamp mode selectively. *See* Falco et al. col. 3 lines 10-12. In complete contrast, the present subject matter is based on an underlying assumption that both RTP/RTCP and NTP are implemented correctly and precisely.

Applicants respectfully submit that in contrast to independent claims 1 and 12, Falco et al. is not concerned with, nor discloses, any "media card clock," much less "each control packet including a remote real time-stamp... and a *separate* remote media card clock time-stamp corresponding to the remote real time-stamp" as recited in the claims. Furthermore, Falco et al. never alludes to the possibility of separate media and system clocks. In col. 2 lines 1-10 and col. 2 lines 20-30, Falco et al. clearly outlines that the RTP timestamps in both RTP and RTCP SR packets are derived from the local wall clock (or system clock). Falco et al. does talk about media streams, but never alludes to separate clocks.

These inherent deficiencies of Falco et al. are not cured by the asserted combination/motivation (on page 6 of the Office Action) that "it would have been obvious... to determine clock skew of the received packets that will be re-transmitted and contain newly localized timestamps." Applicants respectfully disagree; firstly, Falco et al. is simply translating received packet timestamps into local clock timestamps so that the device (MCU in this case) can specify when to transmit them. Falco et al. also fails to mention comparing the difference in received packet timestamps to local timestamps, which would give some indication of skew between remote and local clocks, as recited in the independent claims.

Furthermore, Applicants submit that *assuming arguendo* such a combination is made the resulting structure would not be capable of performing the presently recited functions because:

- Synchronized time is not implemented across each end;
- Falco et al. is looking at single clocks at either end whereas the present subject matter looks at multiple clocks at each end; and
- *Assuming arguendo* that the method of Falco et al. were extended (as suggested on pages 14 and 15 of the Office Action) to introduce separate media and system clocks, and then to look at delta RTP and delta NTP and use these to resolve skew (whereas Falco et al. simply uses this to look for a timestamping problem), then such an asserted combination will only provide skew between a remote media and system clock (or local media /system clock). This would not enable, for example, handling buffer overflow as presently claimed. It is only by implementing synchronized time to provide a common baseline across the ends of the session as claimed in independent claims 1, 12 and 13, that the two rates can be compared to then allow skew between remote and local media clock to be determined (for example, enabling the avoidance of buffer problems as in claim 8).

Thus, the cited art, whether taken individually or in combination, fails to disclose, teach or suggest "[determining clock skew in a packet-based session between said local device and a remote device with a non-deterministic packet delay... comprising ...:

> *receiving a sequence of control packets from the remote device... each control packet including a remote real time-stamp comprising a system clock time of the remote device and a separate remote media card clock time-stamp comprising a media card clock time of the remote device corresponding to the remote real time-stamp*;
>
> *comparing a first real-time stamp and a first remote media card clock time-stamp* from a first received control packet *with a second real-time stamp and a second remote media card clock time-stamp* from a second received control packet, respectively, *to determine...a first relative rate of a remote media card clock to the remote real time system clock*;
>
> *transmitting a sequence of control packets from said local device...each control packet including a local real time-stamp* comprising a system clock time of the local device *and a separate local media card clock time-stamp* comprising a media card clock time of the local device *corresponding to the local real time-stamp; and*
>
> *comparing a third real-time stamp and a first local media card clock time-stamp* from a first transmitted control packet *with a fourth real-time stamp and a second local media card clock time-stamp* from a second transmitted control packet, respectively, *to determine...a second relative rate of a local media card clock to the local real-time system clock*"

(emphases added), as substantially recited in the claims.

In view of the foregoing, Applicants respectfully submit that nothing in the cited reference renders the presently claimed subject matter obvious within the meaning of 35 U.S.C. §103(a). Therefore, Applicants respectfully submit that claims 1 and 12 are therefore non-obvious, novel and patentable over the cited references. For at least the reason that independent claim 1 is patentably distinguishable from the cited references, it is also respectfully submitted that claims 3-10, dependent therefrom, are also patentably distinguishable from the cited art of record.

Applicants submit that the dependent claims disclose further features patentable over the cited art. For example, and in contrast to claim 3, Falco et al. does not presume that wall clocks are synchronized, instead clearly stating that this will typically not be the case, *see* col. 4 lines 65-68, col. 5 lines 2-5, col. 5 lines 32-35. Falco et al. *does* determine an offset between clocks but this is merely a mathematical exercise to help identify when this estimate changes greatly, see test 2 above. In contrast, the present application includes a further step of "synchronizing said local real time rate with said remote real time-rate," as recited in claim 3; thus in contrast to Falco et al., the claimed subject matter employs system clocks tightly synchronized at either end in order to resolve skew between media clocks.

Applicants respectfully submit that in contrast to that recited in claim 9, Falco et al. is unconcerned with "determining... a first approximation of one-way media packet delay; and determining... a skew-corrected one-way media packet delay between devices in said session," thereby implementing skew correction for each way delay. Applicants respectfully submit that any assertion in this regard can only be made with the benefit of the present invention and so with impermissible hindsight.

Similarly, Falco et al. fails to disclose "adjusting a playout strategy of said session according to said skew-corrected one-way media packet delay," as recited in claim 10. Further to the comments above, Applicants respectfully submit that the passages of Falco et al. cited in this regard (col. 5 lines 37-42) refer only to the receiving node specifying precise timestamps for when packet is sent on its way, taking into account network jitter and processing delays (*see* Falco et al. col. 5 and 6) and so Falco et al. fails again to disclose the claimed subject matter.

It is therefore respectfully submitted that claims 1, 3-10 and 12 are novel and non-obvious over the cited art. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections thereto

Rejection of claim 13

As previously discussed, Lockridge et al. uses successive timestamps from packets n and n+1 to determine skew i.e. T2 (timestamp using the server clock, when packets leave the server en route to client) and T3 (timestamp using the client clock, when packets arrive at the client) from packet n and T2' and T3' from packet n+1 where skew = (T3'-T3) / (T2'-T2). Lockridge et al. assumes that propagation delays are constant, and each of T2, T2' and T3, T3' involve the same type of clock counter value.

Applicants respectfully submit that Lockridge et al. fails to cure the deficiencies of Falco et al. with respect to the claimed subject matter in accordance with Applicants' independent claims 1 and 12 and further, does not suggest a teaching or motivation to reach such subject matter as claimed in the instant application, whether individually or in combination. It is at least for these reasons that the cited references (Falco et al. and Lockridge et al.) fail.

Applicants respectfully submit that claim 13 presents a computer program product reciting features similar to those recited in claims 1 and 12, discussed above, and should be deemed non-obvious and patentable over the cited Falco et al. and Lockridge et al. references, *inter alia*, for the reasons discussed in detail above with reference to claims 1 and 12.

In view of the foregoing, Applicants respectfully submit that nothing in the cited prior art of record, whether taken alone or in any combination, renders the presently claimed subject

matter obvious within the meaning of 35 U.S.C. §103(a). Therefore, Applicants respectfully submit that claims 1, 3-10, 12 and 13 are therefore non-obvious and patentable over the cited references. Accordingly, the Examiner is respectfully requested to withdraw these rejections.

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner call the undersigned.

Respectfully submitted,

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